

WHAT IS CLAIMED IS:

1. A semiconductor device, comprising an active layer constituted by a Group III nitride semiconductor layer containing at least three different elements including at least aluminum,

5 wherein the active layer exhibits a fluctuation in the bandgap based on a variation in the distribution of the aluminum content in the active layer.

10 2. A method for fabricating a semiconductor device including an active layer constituted by a Group III nitride semiconductor layer containing at least three different elements including at least aluminum,

15 the method comprising the step of forming the active layer,
 wherein the step of forming the active layer includes the step of causing a fluctuation in the bandgap of the active layer by creating a variation in the distribution of the aluminum content in the active layer.

20 3. The method of claim 2, wherein the step of forming the active layer includes the step of applying laser light onto a target containing the elements of the active layer and vaporizing the element, thereby creating the variation in the distribution of the aluminum content in the active layer.

25 4. The method of claim 3, wherein the target is made of a material having a composition in which the ratio of a Group III element to a Group III nitride semiconductor, a Group III metal or a Group V element is greater than one.

25 5. The method of claim 2, wherein the step of forming the active layer is

performed in a nitrogen atmosphere.

6. A method for fabricating a semiconductor device, the method comprising the step of forming an active layer constituted by a Group III nitride semiconductor layer,

5 wherein the step of forming the active layer includes the steps of:

supplying a first material containing an element for the active layer such that the first material has a coverage ratio less than one with respect to an underlying layer; and

supplying a second material which is different from the first material and contains an element for the active layer, after the step of supplying the first material has been
10 performed.

7. The method of claim 6, wherein the step of supplying the first material includes the step of supplying particles generated by decomposing the first material with heat.

15 8. The method of claim 6, wherein the step of supplying the second material includes the step of supplying particles generated by decomposing the second material with heat.

20 9. The method of claim 7 or 8, wherein the particles contain aluminum as an element.

10. The method of claim 7 or 8, wherein the particles are generated by applying laser light onto a target constituted by a Group III nitride semiconductor and vaporizing the Group III nitride semiconductor.

11. The method of claim 7 or 8, wherein the particles are generated by applying laser light onto a target constituted by a Group III metal and vaporizing the Group III metal.

5 12. The method of claim 7 or 8, wherein the particles have a composition in which the ratio of a Group III element to a Group V element is greater than one.

13. The method of claim 6, wherein the step of forming the active layer is performed in a nitrogen atmosphere.